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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/849,576	05/19/2004	Atilla Peter Kiraly	2003P10074 US01	6334

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Siemens Corporation  
Intellectual Property Department  
170 Wood Avenue South  
Iselin, NJ 08830

EXAMINER
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KAO, CHIH CHENG G

ART UNIT	PAPER NUMBER
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2882

MAIL DATE	DELIVERY MODE
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10/18/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/849,576	KIRALY ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Chih-Cheng Glen Kao	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 September 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 6-15, 17-25, 27, 28, 32 and 33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-4, 6, 11, 12 and 32 is/are allowed.
- 6) ☒ Claim(s) 7-10, 18-20, 23-25, 27, 28 and 33 is/are rejected.
- 7) ☒ Claim(s) 13-15, 17, 21 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Allowable Subject Matter*

1. The indicated allowability of claim 23 is withdrawn in view of the newly discovered reference(s) to Li et al. (US 6470092). Rejections based on the newly cited reference(s) follow.

### *Claim Objections*

2. Claims 7, 10, 13-15, 17-22, 24, 25, 27, and 33 are objected to because of the following informalities, which appear to be minor draft errors including grammatical and/or lack of antecedent basis problems.

In the following format (location of objection; suggestion for correction), the following correction(s) may obviate the objection(s): (claim 7, line 6, "fraction of the distance"; replacing "distance" with --original distance value--), (claim 10, line 6, "fraction of the distance"; replacing "distance" with --original distance value--), (claim 13, line 10, "the program code"; inserting --code-- after "program" in line 3 of claim 13 and inserting --code-- after "program" in line 5 of claim 13), (claim 14, line 2, "the program code"; making the above changes in claim 13), (claim 17, line 2, "the program code"; making the above changes in claim 13), (claim 18, line 2, "the program code"; making the above changes in claim 13), (claim 19, line 2, "the program code"; making the above changes in claim 13), (claim 20, line 2, "the program code"; making the above changes in claim 13), (claim 20, line 6, "of the distance"; replacing "distance" with --original distance value--), (claim 22, line 2, "the program code"; making the above changes in claim 13), (claim 24, line 1, "The system"; replacing "system" with --product--),

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(claim 25, line 1, "The system"; replacing "system" with --product--), (claim 27, line 1, "The system"; replacing "system" with --product--), and (claim 33, line 11, "the distance from the location"; replacing "distance" with --original distance value--).

Claims 14, 15, and 17-22 are objected to by virtue of their dependency. For purposes of examination, the claims have been treated as such. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 7 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are with regards to steps for a second plurality of rays.

Claims 7 and 18 recite steps for a third plurality of rays. Claims 1 and 13, from which claims 7 and 18 respectively depend, recite steps for a first plurality of rays. However, there are no steps for a second plurality of rays. Since it is not clear as to how one can have steps for a third plurality of rays when there are no steps for a second plurality of rays, the claims are rejected for being incomplete.

4. Claims 8 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are with regards to steps for a second and third plurality of rays.

Claims 8 and 19 recite steps for a fourth plurality of rays. Claims 1 and 13, from which claims 8 and 19 respectively depend, recite steps for a first plurality of rays. However, there are no steps for a second and third plurality of rays. Since it is not clear as to how one can have steps for a fourth plurality of rays when there are no steps for a second and third plurality of rays, the claims are rejected for being incomplete.

5. Claims 9 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are with regards to steps for a second, third, and fourth plurality of rays.

Claims 9 and 20 recite steps for a fifth plurality of rays. Claims 1 and 13, from which claim 9 and 20 depend, recite steps for a first plurality of rays. However, there are no steps for a second, third, and fourth plurality of rays. Since it is not clear as to how one can have steps for a fifth plurality of rays when there are no steps for a second, third, and fourth plurality of rays, the claims are rejected for being incomplete.

6. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are with regards to steps for a second, third, fourth, and fifth plurality of rays.

Claim 10 recites steps for a sixth plurality of rays. Claim 1, from which claim 10 depends, recites steps for a first plurality of rays. However, there are no steps for a second, third,

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fourth, and fifth plurality of rays. Since it is not clear as to how one can have steps for a sixth plurality of rays when there are no steps for a second, third, fourth, and fifth plurality of rays, the claim is rejected for being incomplete.

7. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

35 U.S.C. 112, sixth paragraph states that a claim limitation expressed in means-plus-function language “shall be construed to cover the corresponding structure...described in the specification and equivalents thereof.” “If one employs means plus function language in a claim, one must set forth in the specification an adequate disclosure showing what is meant by that language. However, in this application, there is no corresponding structure (or material or acts) of a means (or step)-plus-function limitation disclosed in the specification itself in a way that one skilled in the art would understand what structure (or material or acts) would perform the recited function. Since Applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112.” See MPEP 2181(II).

8. Claim 33 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 33 recites the following:

“processing the gradient to detect a protrusion in the medical image, wherein the gradient is processed by:

projecting a plurality of rays from a location comprising an original distance value in the distance mapped image;

determining a distance value for each of the plurality of rays that is a fraction of the distance from the location;

calculating a first sphere-based response of the plurality of rays; and

detecting the protrusion using the first sphere-based response; or

calculating a second sphere-based response of the plurality of rays;

calculating a gray-level difference of the distance mapped medical image; and

detecting the protrusion using the gray-level difference; or

determining a distance value for each of the plurality of rays that has a supplementary ray that has a distance value less than the original distance value;

calculating a hemisphere-based response of the plurality of rays; and

detecting the protrusion using the hemisphere-based response.”

However, it is not clear as to what the scope of the claim is. In other words, it is not clear as to what the alternatives are.

Are the alternatives as follows:

processing the gradient to detect a protrusion in the medical image, wherein the gradient is processed by:

projecting a plurality of rays from a location comprising an original distance value in the distance mapped image;

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(determining a distance value for each of the plurality of rays that is a fraction of the original distance value from the location;

calculating a first sphere-based response of the plurality of rays; and  
detecting the protrusion using the first sphere-based response;) or

(calculating a second sphere-based response of the plurality of rays;  
calculating a gray-level difference of the distance mapped medical image; and  
detecting the protrusion using the gray-level difference;) or

(determining a distance value for each of the plurality of rays that has a supplementary ray that has a distance value less than the original distance value;

calculating a hemisphere-based response of the plurality of rays; and  
detecting the protrusion using the hemisphere-based response)?

Or perhaps, the alternatives as follows:

processing the gradient to detect a protrusion in the medical image, wherein the gradient is processed by:

projecting a plurality of rays from a location comprising an original distance value in the distance mapped image;

determining a distance value for each of the plurality of rays that is a fraction of the distance from the location;

(calculating a first sphere-based response of the plurality of rays; and  
detecting the protrusion using the first sphere-based response;) or

(calculating a second sphere-based response of the plurality of rays;  
calculating a gray-level difference of the distance mapped medical image; and  
detecting the protrusion using the gray-level difference;) or

(determining a distance value for each of the plurality of rays that has a supplementary ray that has a distance value less than the original distance value;

calculating a hemisphere-based response of the plurality of rays; and  
detecting the protrusion using the hemisphere-based response).



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Since the claim is not clear as to what the alternatives are, the claim has been rejected for being indefinite.

9. Claim 33 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are with regards to steps for a first sphere-based response before the steps for a second sphere-based response.

Claim 33 recites steps as an alternative for a second sphere-based response. However, since this is an alternative, there are no steps for a first plurality of rays in this alternative method. Since it is not clear as to how one can have steps for a second sphere-based response when there are no steps for a first sphere-based response in this alternative method, the claim is rejected for being incomplete.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 23-25, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bick et al (US 5452367) in view of Li et al.

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11. Regarding claims 23 and 28, Bick et al. discloses a computer program product comprising a computer useable medium having computer program logic recorded thereon and a system with means for detecting a protrusion in a medical image (col. 1, lines 60-69), the computer program logic comprising: program code for segmenting a medical image (col. 6, lines 3-5); program code for calculating a distance map of the medical image (col. 6, lines 5-7); program code for calculating a gradient of the distance mapped medical image (col. 6, lines 23-25); and program code for processing the gradient to detect a protrusion in the medical image (col. 6, lines 54-63).

However, Bick et al. fails to disclose program code and means for storing a list of one or more detected protrusions; and program code and means for filtering one or more false positives from the list, wherein one or more of the false positives is not one of a nodule, lesion, polyp, pre-cancerous growth, and cancerous growth.

Li et al. teaches program code and means (abstract, lines 3-5) for storing a list of one or more detected protrusions (fig. 1, #30); and program code and means for filtering one or more false positives from the list, wherein one or more of the false positives is not one of a nodule, lesion, polyp, pre-cancerous growth, and cancerous growth (fig. 1, #70).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the product of Bick et al. with the filtering of Li et al., since one would have been motivated to make such a modification for reducing the number of false positives, wherein such false positives are a main difficulty in clinical applications (col. 1, line 50 through col. 2, line 2) as shown by Li et al.

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12. Regarding claim 24, Bick et al. further discloses program code for acquiring the medical image (col. 5, lines 63-67).

13. Regarding claim 25, Bick et al. as modified above suggests a product as recited above.

However, Bick et al. fails to disclose wherein the image is acquired by one of a computed tomographic (CT), helical CT, x-ray, positron emission tomographic, fluoroscopic, ultrasound, and magnetic resonance (MR) imaging technique.

Li et al. teaches wherein the image is acquired by one of a computed tomographic (CT), helical CT, x-ray, positron emission tomographic, fluoroscopic, ultrasound, and magnetic resonance (MR) imaging technique (col. 2, lines 44-63).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the product of Bick et al. with the image acquisition of Li et al., because of the following rationale. Since the Examiner finds that the prior art (i.e., Bick et al.) contained a product which differed from the claimed product by the substitution of some component with another component, and since the Examiner finds that the substituted components and their functions were known in the art (as shown by Li et al. (col. 2, lines 44-64)), the Examiner thus finds that one of ordinary skill in the art could have substituted one known component for another, and the results of the substitution would have been predictable. Therefore, such a claimed combination would have been obvious. Furthermore, one would have been motivated to make such a modification for reducing the number of false positives in those medical images (col. 1, line 50 through col. 2, line 2) as shown by Li et al.

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14. Regarding claim 27, Li et al. further teaches wherein the protrusion is one of nodule, lesion, polyp, pre-cancerous group, and cancerous growth (fig. 1, #80).

*Allowable Subject Matter*

15. Claims 1-4, 6, 11, 12, and 32 are allowed. Claims 7-10 and 18-20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Claims 13-15, 17, 21, and 22 would be allowable if amended to overcome the claim objections(s) set forth in this Office action. The following is a statement of reasons for the indication of allowable subject matter.

16. Regarding claim 1, the prior art fails to disclose or fairly suggest a method for detecting a protrusion in a medical image, including wherein the gradient is processed by: projecting a first plurality of rays from a location in the distance mapped medical image; calculating a value for each of the first plurality of rays based on features of each of the first plurality of rays and the gradient of the distance mapped medical image; and summing and scaling the value of each of the first plurality of rays, in combination with all of the other limitations in the claim. Claims 2-4 and 6-12 contain allowable subject matter by virtue of their dependency.

17. Regarding claim 13, the prior art fails to disclose or fairly suggest a system for detecting a protrusion in a medical image, including wherein when processing the gradient, the processor is operative with the program code to: project a first plurality of rays from a location in the

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distance mapped medical image; calculate a value for each of the first plurality of rays based on features of each of the first plurality of rays and the gradient of the distance mapped medical image; and summing and scaling the value for each of the first plurality of rays, in combination with all of the other limitations in the claim. Claims 14, 15, and 17-22 contain allowable subject matter by virtue of their dependency.

18. Regarding claim 32, the prior art fails to disclose or fairly suggest a method for detecting a protrusion in a medical image, including wherein the gradient is processed by: projecting a plurality of rays from a location comprising an original distance value in the distance mapped medical image; calculating an absolute value of a difference between a length of each of the plurality of rays and a distance value at an end of each of the plurality of rays, wherein the length of each of the plurality of rays is a fraction of the original distance value from the location; and dividing a sum of the absolute value by the total number of the plurality of rays, in combination with all of the other limitations in the claim.

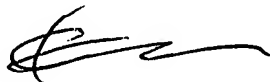
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Chih-Cheng Glen Kao  
Primary Examiner  
Art Unit 2882